BEFORE THE

FEDERAL COMMUNICATIONS COMMISSION

WASHINGTON, D.C. 20554

In the Matter of	)	
	)	ET Docket No. 99-254
Closed Captioning Requirements for	)	
Digital Television Receivers	)	

COMMENTS OF GENERAL INSTRUMENT CORPORATION

Christine G. Crafton
Vice President
General Instrument Corporation
1225 I Street, N.W.
Washington, D.C. 20005
(202) 833-9700

WILLKIE FARR & GALLAGHER
Three Lafayette Centre
1155 21st Street, N.W.
Suite 600
Washington, D.C. 20036-3384
(202) 328-8000

Its Attorneys

Dwight Sakuma
Director of Consumer Products
and Services
General Instrument
101 Tournament Dr.
Horsham, PA 10944
(215) 323-1492

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TABLE OF CONTENTS

PAGE NO.

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General Instrument Corporation ("GI"), by its attorneys, hereby files its comments on the Notice of Proposed Rulemaking ("Notice") in the above-captioned proceeding.[1]

I. INTRODUCTION AND SUMMARY

GI has always been a consistent supporter of the Commission's efforts to make closed captioning more widely available in this country. Even though to date it has not been subject to any Commission rule requiring it to do so, GI has invested extensively and has taken every possible measure to ensure a successful end-to-end system implementation and deployment of closed captioning functionality in set-top converters that have already been deployed to millions of American consumers.

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[1] In the Matter of Closed Captioning Requirements for Digital Television Receivers, ET Docket No. 99-254, FCC 99-180 (rel. July 15, 1999) ("Notice").

Indeed, GI was the first company to manufacture digital converters capable of responding to encoded caption information and to date has shipped over 5.2 million such devices, 4.5 million of which have already been deployed in cable systems. GI is very proud of these accomplishments and fully intends to continue these efforts to ensure that hearing-impaired individuals will be able to share fully in the future of video entertainment and education.

While GI thus supports the goal of the Notice to assist the hearing-impaired in the digital television environment, GI is concerned that several of the Notice's proposals regarding use of the EIA-708-A standard, if implemented, would have a significant negative impact on consumers, manufacturers, cable programmers, and cable operators.[2]

GI's two specific concerns relate to the two fundamental aspects of the EIA-708-A standard. First, the standard specifies how closed captions in digital video streams are to be carried to end-user TV receivers. Specifically, it requires the captions to be carried in the A/53 format ("Carriage Issue"). Second, the standard specifies what advanced captioning functionality should be available to allow consumers to change the appearance of captioned text (e.g., font, spacing, color, or windowing) on the consumer's TV screen ("Advanced Features Issue").

With respect to the Carriage Issue, GI is concerned that adoption of the EIA-708-A standard would render obsolete the

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[2] GI notes that since the Notice was adopted, EIA-708-A has been revised and EIA-708-B is the latest version of the standard.

substantial deployed base of closed captioning encoding and decoding equipment used in the cable industry, since such equipment is designed solely to process 608 captions, not 708 captions, and only 608 captions that are carried in the DVS-157 format as opposed to the A/53 format specified in the EIA-708-A standard. For example, the 4.5 million GI digital converters already deployed to consumers only process captions in the DVS-157 format, a format that is an open standard that has been established for the cable industry by the Society of Cable Telecommunications Engineers ("SCTE").[3] These digital converters cannot be upgraded to accommodate the A/53 format and thus would be disabled by a Commission requirement that decoders conform to the A/53 format.[4] As a result, hearing-impaired individuals and other consumers that currently use these deployed digital converters to decode closed captions for their analog TVs would be frustrated because they would be left with equipment that no longer works and would, at great inconvenience, be forced to replace or supplement such equipment.

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[3] Moreover, GI has agreed to license the intellectual property it has in the DVS-157 standard to all parties on a reasonable, non-discriminatory, and royalty-free basis.

[4] The fact that the Notice proposes to apply the rules only to equipment manufactured one year after the rules' adoption does not help this situation. Since the deployed digital converters have useful lives of five years and greater, they will still be around for quite a while to allow consumers with analog TVs to view digital video signals. If the standard for carrying closed captions is changed by Commission rule to the A/53 format and programmers thereafter no longer carry captions in the DVS-157 format, these boxes would no longer be able to decode captions after the rule takes effect.

To rectify this incompatibility with existing equipment, many consumers, programmers, manufacturers, and cable operators alike would have to incur significant costs. As GI describes below, for example, the cost to cable operators alone to upgrade their digital headends to decode 608 captions in the A/53 format and re-encode them in the DVS-157 format so they could be understood by existing digital converters in the field would be approximately $40-50 million. Cable programmers would also incur millions of dollars in expenses to upgrade their digital encoders to carry 608 captions in the A/53 format. And both cable operators and cable programmers would encounter additional field engineering costs and significant operational hurdles and burdens to implement and test such upgrades. Moreover, since carriage of the 608 captions in the A/53 format provides no advantages over carriage of 608 captions in the DVS-157 format, these significant costs would be entirely unjustified.

With respect to the Advanced Features Issue, GI believes that adoption of the EIA-708-A standard is not necessary to allow consumers to customize the display of the captions and that such advanced captioning functionality can be achieved in much more efficient ways using the well-established EIA-608 standard and the built-in capabilities of digital TVs.

In light of these cost, efficiency, and compatibility concerns, GI respectfully suggests the following:

- The Commission should focus not just on the adoption of technical standards for the display of closed captions on new digital TVs, but also on how to ensure that there is compatibility between the closed captions that are carried in digital video streams and the substantial deployed base of digital cable encoding and decoding equipment. One way to ensure both backward and forward

compatibility would be to require that all captions are transmitted in the well-established DVS-157 format and that digital TVs are capable of decoding captions in the DVS-157 format. Alternatively, the Commission could consider a solution based on "dual carriage" under which any broadcaster that carries 608 captions in the A/53 format also carries the 608 captions in the well-established DVS-157 format; and

- The Commission should refrain from requiring manufacturers to provide advanced captioning functionality through dedicated caption decoder processing built to the EIA-708-A standard. Rather, the Commission should: (1) rely on the well-established EIA-608 standard; (2) specify in its rules what advanced captioning display options consumers should have (e.g., the ability to change screen position, color, spacing, and font); and (3) afford manufacturers the flexibility to determine how to implement these options using the most efficient technical solution available, such as through the existing graphics processor in digital TVs.

II. THE COMMISSION'S RULES MUST ADDRESS HOW TO AVOID RENDERING OBSOLETE THE SUBSTANTIAL DEPLOYED BASE OF DIGITAL ENCODING AND DECODING CAPTIONING EQUIPMENT USED IN THE CABLE INDUSTRY.

While GI appreciates that the proposed rules will only apply prospectively to new equipment, it is nonetheless concerned about the effects of the new rules on captioning equipment that has already been deployed. As the Commission may know, most existing captioning equipment -- including all cable programmers' digital encoders, digital networks such as HITS, digital cable headend equipment, and digital converters used by cable subscribers -- only supports 608 captions, not 708 captions, and only 608 captions that are carried in the DVS-157 format, as opposed to the A/53 format specified by the EIA-708-A standard.

As a result, to comply with a Commission requirement that 608 captions be carried in the A/53 format, cable programmers would have to spend between $18,000 and $28,000 per encoder (depending on the status of the encoder's warranty and excluding all field

engineering implementation costs) for new encoding software to carry 608 captions in the A/53 format.

Likewise, cable systems -- which are all currently designed to process, deliver, and decode 608 captions in the DVS-157 format -- would be unable to process captions in the A/53 format, and cable operators would therefore confront two costly and equally undesirable alternatives: (1) purchase and install new equipment at each headend to parse and decode the 608 captions carried in the new A/53 format and re-encode them in the DVS-157 format so they can be understood by all 4.5 million (and growing) deployed digital converters, and, in turn, displayed on analog TVs; or (2) dispatch a truck and technician to swap existing digital converters for subscribers who wish to receive the closed captioning information in the new A/53 format. Either alternative would be extremely expensive for such distributors and, ultimately, for consumers. For example, the cost to cable operators alone to pursue the former of the above options would be approximately $7,000 per digital transport multiplex feed, which would translate into approximately $42,000 to $50,000 per digital-capable headend. Since there are approximately 1,000 cable headends currently delivering digital video signals, the cost to cable operators in the aggregate would be approximately $40-$50 million, excluding the significant additional field engineering costs to implement such new equipment.[5]

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[5] Of course, the number of digital-capable headends and the number of deployed digital converters will be much higher still by the time the Commission's rules become effective, which would (continued ...)

Nor are the incompatibilities with the deployed base of equipment limited to digital encoders and decoders. For example, certain program services carry V-Chip rating information, using the 608 standard, on line 21 of the VBI.[6] Since implementation of the proposed EIA-708-A standard (with the 608 in A/53 format) would prevent the deployed base of digital cable converters from being able to pass along this rating information, it would also disable the V-Chip functionality in existing TVs for such programming.

It is important to stress that the enormous costs that would be incurred by cable programmers, distributors, manufacturers, and consumers alike to carry 608 captions in the A/53 format would provide no corresponding benefits to consumers over carriage of 608 captions in the existing DVS-157 format.[7]

The Commission must address these backward compatibility issues in this rulemaking. The optimal way to achieve backward compatibility would be to require that all closed captions are transmitted in the well-established DVS-157 format and that digital TVs are capable of decoding captions in the DVS-157 format.

(... continued)

further increase the costs for addressing these backward compatibility issues.

[6] See In the Matter of Technical Requirements to Enable Blocking of Video Programming Based on Program Ratings, 13 FCC Rcd. 11248, at ¶ 7 (1998) ("V-Chip Order").

[7] Moreover, as discussed in Section III below, adoption of the EIA-708-A standard is not necessary to afford consumers greater control over the display of closed captions; rather, such advanced captioning functionality can be achieved in a much more efficient manner using 608 captions and the graphics processing functionality of digital TVs.

Alternatively, the Commission could consider a solution based on "dual carriage" under which any broadcaster that delivers 608 captions in the A/53 format also carries the 608 captions in the well-established DVS-157 format. Such a dual-carriage approach would ensure that the 608 captions delivered in a digital video signal would be backwardly compatible with the substantial deployed base of closed captioning cable headend and decoding equipment. Consequently, consumers would not be frustrated by existing equipment that suddenly no longer works after the effective date of the Commission's new rules. Rather, such consumers would be able to continue to receive closed captions on their analog TVs without having to incur any additional expense (or any inconvenience) to obtain new or supplemental decoding equipment.[8]

III. ADOPTION OF EIA-708-A IS NOT NECESSARY TO PROVIDE CONSUMERS WITH ADVANCED CAPTIONING FUNCTIONALITY. THE COMMISSION CAN ACHIEVE SUCH FUNCTIONALITY MORE EFFICIENTLY BY: (1) RELYING ON THE EIA-608 STANDARD; (2) SPECIFYING IN ITS RULES WHAT CAPTIONING DISPLAY OPTIONS CONSUMERS SHOULD HAVE; AND (3) AFFORDING MANUFACTURERS FLEXIBILITY ON HOW TO IMPLEMENT THOSE OPTIONS IN DIGITAL TVS.

As noted above, the second aspect of the EIA-708-A standard (and, no doubt, part of its importance to the hearing-impaired community) is that it would allow consumers to customize the display of the captions on their TV screen using advanced features

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[8] It is important to note that even if digital receivers were to incorporate dual processing functionality for both the A/53 and the DVS-157 formats, that alone would not solve the backward compatibility problem. Absent dual carriage, for example, cable systems that carry a broadcaster's digital signal would be unable to process and decode the closed captions carried in the digital broadcast signal which is transmitted in the A/53 format.

(e.g., the ability to change screen position, color, spacing, and font). But adoption of the EIA-708-A standard is not necessary to achieve such advanced captioning features; in fact, pursuing such advanced captioning functionality via the EIA-708-A standard will be a highly inefficient route.

Achieving such advanced captioning functionality using EIA-708-A would mean that all programmers' encoders would have to be significantly upgraded or replaced so that the enhancements specified in Section 9 of the EIA-708-A standard could be inserted when the captions are initially encoded for transmission. This is a very expensive proposition. It would require a chassis design change for each encoder at a cost of approximately $34,000 per chassis. Given that there are hundreds of encoders and chassis in the field that would have to be upgraded or replaced, on an industry-wide basis the cost would run well into the tens of millions of dollars, not including the significant field engineering support costs to implement such equipment changes. In addition to these chassis upgrade costs, programmers would incur additional costs of approximately $5,000 per service for computer servers which generate the 708 captions and interface with the encoder.[9]

Adoption of the EIA-708-A standard would impose unnecessary complexity on manufacturers as well. For example, in order to comply with Section 9 of EIA-708-A, digital converter manufacturers

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[9] Depending on the system configuration, a digital encoder typically encodes 5 to 6 services.

would have to incorporate a separate closed captioning decoding function capable of processing 708 captions in addition to the decoding function they already provide for the processing and transcoding of 608 captions for millions of analog TVs. An approach which required the design and implementation of a special decoder that is 708 compliant would also be less efficient for a digital TV than an approach which allowed the digital TV's generic graphics processor to be used for this rendering and display function.

In short, GI strongly believes that requiring manufacturers to incorporate separate "decoder circuitry that functions pursuant to the recommendations in Section 9 of EIA-708-A"[10] is an extremely inefficient way to provide consumers such advanced captioning capabilities. The Commission could achieve equivalent advanced captioning capabilities at significantly lower costs by: (1) relying on the existing and well-established EIA-608 standard; (2) specifying in its rules what advanced captioning display options consumers should have; and (3) affording manufacturers the flexibility to determine how to implement those options in the most efficient and consumer-friendly manner possible.

Under this regulatory approach, captions would continue to be transmitted pursuant to the EIA-608 standard, but a digital TV could decode the 608 captioning text and then pass it to the TV receiver's graphics processor for display based on the user's pre-

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[10] Notice at ¶ 9.

selected advanced features. In this regard, GI notes that digital TVs already have extensive graphics processing capabilities that can be extended, through various software upgrades, to allow consumers to enhance the display and rendering of closed captions. In fact, the principal features of the EIA-708-A standard, such as changing screen position, color, spacing, and font, can be easily and efficiently done by a very basic general purpose graphics processor.[11]

It is important to emphasize that this approach will not diminish the resulting advanced captioning functionality available to consumers. The Commission's rules can be fairly specific on the types of functionality that must be available to consumers (such as that decoders must support 8 colors; solid and flashing character foreground type attributes; left, right, and center justification; sufficient storage capacity for 8 rows of captions, etc.[12]). All

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[11] Continued reliance on the EIA-608 standard is further supported by the fact that the EIA-708-A standard is relatively new and not at all widely accepted in the video industry. The EIA-608 standard, in contrast, enjoys widespread acceptance and support across the industry. In fact, the Commission has relied on the EIA-608 standard in several recent proceedings for this very reason. See, e.g., V-Chip Order at ¶ 5 (noting the "broad acceptance" of the EIA-608 standard in the video industry as well as the Commission's reliance on that standard); In Re Closed Captioning and Video Description of Video Programming, 13 FCC Rcd 3272, at ¶ 213 (1997) ("We have relied on the [EIA-608] standard for specific information on the use of line 21 and have found it a useful supplement to the specific requirements of our rules"). The Commission should, therefore, be especially wary of moving to the EIA-708-A standard, particularly when such a change would cause significant -- and unwarranted -- disruption in the video marketplace.

[12] These suggested requirements are taken from Section 9 of the EIA-708-A standard.

new digital TVs covered by the rules would then incorporate the functionality to display the captions according to these Commission requirements.[13] In short, nothing would be lost for the consumer under this more flexible and more efficient approach.[14]

Finally, this approach would also be fully consistent with Congress' intent under the Television Decoder Circuitry Act of 1990 ("TDCA") to permit "flexibility in the development of decoding technology."[15] Both the House and Senate Reports state that "in developing display standards, the FCC will pay due regard to considerations of cost-effectiveness and evolving technical capability, as well as the benefits to the competitive process of

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[13] Of course, manufacturers would always have the option of providing consumers even more options than those required by the rules.

[14] A flexible regulatory approach is particularly warranted given the questionable nature of the Commission's authority to impose decoding requirements on converter boxes under the TDCA. The fact that "most set-top converters ... will be used with picture screens that are 13 inches or larger" (Notice at ¶ 12) is irrelevant because an apparatus is covered by the Act only when "its television picture screen is 13 inches or greater in size." (emphasis added). In fact, the Commission has previously acknowledged that the TDCA does not afford it jurisdiction over separate decoding devices. See Public Notice, "Closed Captioning Requirements for Computers Systems Used As Television Receivers," 11 FCC Rcd. 4455 (1995) (clarifying that only computer systems that are integrated with, or sold together with, a monitor that has a viewable picture of 13 inches or larger are subject to the Commission's rules under the TDCA, and that separate "plug-in" computer circuit boards (which are essentially like digital converters) are outside the scope of the TDCA and the rules).

[15] 136 Cong. Rec. S12016 (Aug. 2, 1990) (Statement of Sen. Ernest Hollings).

allowing manufacturers the widest possible latitude consistent with the purposes of the [TDCA]."[16]

IV. GI SUPPORTS THE COMMISSION'S PROPOSAL TO APPLY THE NEW RULES ONLY TO EQUIPMENT MANUFACTURED AFTER THE RULES' ADOPTION, BUT SUGGESTS THAT A TWO-YEAR PHASE IN WOULD BE MORE APPROPRIATE.

GI supports the Commission's proposal to apply its new closed captioning rules only to equipment manufactured a certain period after adoption of the rules.[17] This approach is fully consistent with the TDCA and Commission precedent.

Congress made clear in discussing the applicability of the TDCA that all regulatory requirements imposed by the Commission should be forward-looking only:

> The Committee recognizes that on July 1, 1993 manufacturers and dealers of television sets may have an unsold inventory of finished television sets that are not equipped with built-in decoder circuitry. It is not the Committee's intent to burden consumer electronics dealers and manufacturers with an inventory of television sets that cannot be sold legally as a result

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[16] House Report at 14; Senate Report at 9. See also In Re Amendment of Part 15 of the Commission's Rules to Implement the Provisions of the Television Decoder Circuitry Act of 1990, 6 FCC Rcd. 2419, at ¶ 11 (1991) ("We believe Congress intended manufacturers to be allowed different methods of accomplishing the display of captions with cost to the manufacturer (and, ultimately, to the consumer) a significant concern.") ("1990 TDCA Order").

In fact, this approach which specifies what the rule requires but leaves it to the manufacturers to decide how best to achieve it is typically how the Commission has approached such issues. See, e.g., Access to Telecommunications Service, Telecommunications Equipment and Customer Premises Equipment by Persons with Disabilities, WT Docket No. 96-198, FCC 99-181 (rel. Sept. 29, 1999), at ¶¶ 43-54 (establishing rules defining when the design of a product to be accessible to persons with disabilities is "readily achievable," but affording manufacturers flexibility on how to achieve such accessibility through various product designs).

[17] See Notice at ¶ 14.

> of this legislation. Hence, the prohibition in Section 4 from 'shipping in interstate commerce' on or after July 1, 1993 television sets that do not contain built-in decoder circuitry applies only to products manufactured on or after that date. This section places no restriction on the shipping or sale of television sets without built-in decoder circuitry that were manufactured before July 1, 1993 and that remain in factories or stores as unsold inventory after that date.[18]

The Commission correctly implemented this clear congressional intent in its existing rules, stating that the TDCA "appl[ies] only to products manufactured on or after July 1, 1993."[19]

However, GI believes that the one-year time frame proposed in the Notice is an insufficient amount of time for the industry to transition to the changes that will be required as a result of this proceeding. Thus, GI proposes that the new rules apply to all equipment manufactured two years after adoption of the rules. This amount of time is fully consistent with Commission precedent. For example, when it adopted its initial closed captioning rules for analog TVs, the Commission adopted a phase in period that exceeded two years.[20]

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18 House Report at 15 (emphasis added).

19 In Re Amendment of Part 15 of the Commission's Rules to Implement the Provisions of the Television Decoder Circuitry Act of 1990, 7 FCC Rcd. 2279, ¶ 4 (1992) ("1990 TDCA Reconsideration Order"). See also 47 C.F.R. § 15.119(a) (Note) ("This paragraph places no restriction on the shipping or sale of television receivers that were manufactured before July 1, 1993.").

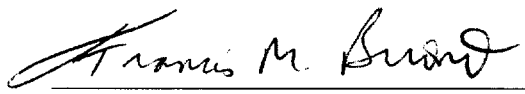
20 See 1990 TDCA Order at ¶ 42 and 1990 TDCA Reconsideration Order at ¶ 4 (order adopting new rules was released on April 12, 1991, but rules only applied to equipment manufactured after July 1, 1993).

V. CONCLUSION

Based on the foregoing, GI respectfully urges the Commission to adopt closed captioning decoder requirements consistent with the comments set forth herein.

Respectfully submitted,

GENERAL INSTRUMENT CORPORATION



Christine G. Crafton
Vice President
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Washington, D.C. 20036-3384
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